REMARKS

The above amendment with the following remarks is submitted to be fully responsive to the Official Action of March 13, 2003. Reconsideration of this application in light of the amendment and the allowance of this application are respectfully requested. Claims 14-26 were pending in the present application prior to the above amendment. In response to the Office Action, the originally filed claims 19-26 have been amended and new claims 27-28 have been added. Therefore, claims 14-28 are now pending in the present application and are believed to be in proper condition for allowance.

Initially, Applicants acknowledge with appreciation the Examiner's allowance of claims 14-18.

I. Summary of the Claim Amendments

Independent claim 19 is herein amended to include a limitation reciting that the formed member formed by the method of the present invention is for a vehicle body, in particular. Claim 19 is also herein amended to include a limitation reciting that only a specific region of the formed member for a vehicle body is strengthened by the nitriding treatment.

Claim 20 is herein amended to be rewritten in independent form and to include a limitation reciting that, in the step of preparing a first blank material and a second blank material having different elongation properties, the second blank material is made of a steel sheet material having tensile strength of 500 MPa or less and contains as the nitriding element a predetermined amount of at least one element of titanium (Ti), niobium (Nb), boron (B), vanadium (V) and aluminum (Al). Claim 20 is also amended to include the additional step of performing a nitriding treatment on second blank material of the formed member so that an average hardness in the sheet thickness direction of the resultant steel sheet member is Hv 300 or more by Vickers hardness, and wherein the difference in hardness between a surface part and an inside center part in the thickness direction of the steel sheet member of the formed member is Hv 200 or less by Vickers hardness.

Claim 21 is herein amended to be rewritten in independent form and include the steps of (i) preparing a steel sheet material having tensile strength of 500 MPa or less and containing a nitride element, wherein the steel sheet material contains as the nitriding element a predetermined amount of at least one element of Titanium (Ti) , niobium (Nb), boron (B), vanadium (V) and aluminum (Al); (ii) forming a formed member for a vehicle body of a predetermined shape having a closed section by performing a plastic forming on the steel sheet material; and (iii) performing a nitriding treatment on a specified region of the formed member so that an average hardness in the sheet thickness direction of the resultant steel sheet member is Hv 300 or more by Vickers hardness, wherein the different in the hardness between a surface part and an inside center part in the thickness direction of the steel sheet member of the formed member is Hv 200 or less by Vickers hardness. Claim 21 is also amended to (i) rephrase the "setting" step to include setting a foam material by adhesion to at least the specified region made porous by the nitriding treatment; and (ii) to include the limitation reciting that the step of causing the foam material to expand by heating the formed member, thereby fills the closed space thereof with expanded foam material and reinforces the formed member for a vehicle body.

Claim 22 is herein amended to be rewritten in independent form and to further limit the step of forming a perform having a pipe-like shape which is relatively approximate to a final shape of the formed member by including a limitation reciting that wherein the perform is made of a steel material having tensile strength of 500 MPa or less and containing, as a nitriding element, a predetermined amount of at least one element of titanium (Ti), niobium (Nb), boron (B), vanadium (V) and aluminum (Al). Claim 22 is also amended to include the step of performing a nitriding treatment on the formed member so that an average hardness in the material thickness direction of the resultant steel member is Hv 300 or more by Vickers hardness, wherein the difference in hardness between a surface part and an inside center part in the thickness direction of the steel member of the formed member is Hv 200 or less by Vickers hardness, and only a specific region of the formed member for a vehicle body is strengthened by the nitriding element.

Claim 23 is herein amended to be rewritten in independent form and to include the same limitation added to claim 19 discussed above. Claim 24 is herein amended to include the same limitations added to claim 20 discussed above.

Claim 25 is herein amended to include the limitation reciting that the formed member has an average hardness in the sheet thickness direction of Hv 300 or more by Vickers hardness by plastically forming a steel sheet into a predetermined shape and performing a nitriding treatment after the plastic forming, wherein the steel sheet material has a tensile strength of 500 MPa or less and contains as a nitriding element, a predetermined amount of as least one element of titanium (Ti), niobium (Nb), boron (B), vanadium (V) and aluminum (Al), wherein a difference in the hardness between the surface part and the inside center part in the thickness direction of the steel member of the formed member is Hv 200 or less by Vickers hardness, wherein only a specific region of the formed member for vehicle body is strengthened by the nitriding treatment.

Claim 25 is also herein amended to (i) rephrase the "setting" step to include setting a foam material by adhesion to at least the specified region made porous by the nitriding treatment; and (ii) include the limitation reciting that the step of causing the foam material to expand by heating the formed member, thereby fills the closed space thereof with expanded foam material and reinforces the formed member for a vehicle body, as set forth in amended claim 21 discussed above.

Claim 26 is herein amended to include the limitation reciting that include the limitation reciting that the formed member has an average hardness in the sheet thickness direction of Hv 300 or more by Vickers hardness by plastically forming a steel material into a predetermined shape and performing a nitriding treatment after the plastic forming, wherein the steel material has a tensile strength of 500 MPa or less and contains as a nitriding element, a predetermined amount of as least one element of titanium (Ti), niobium (Nb), boron (B), vanadium (V) and aluminum (Al), wherein a difference in the hardness between the surface part and the inside center part in the thickness direction of the steel member of the formed member is Hv 200 or less by Vickers hardness, wherein only a specific region of the formed member for vehicle body is strengthened by the nitriding treatment.

Newly added claim 27 is dependent on claim 19 for the method for producing a formed member made of a steel sheet for a vehicle body, as discussed above, and includes the limitation reciting that a plurality of strengthened regions are aligned in a specified direction with unstrengthened regions interposed therebetween.

Newly added claim 28 is dependent on claim 23 for the formed member of a steel sheet for a vehicle body, discussed above, and includes the limitation recitation that a plurality of strengthened regions are aligned in a specified direction with unstrengthened regions interposed therebetween.

II. Rejection Under 35 U.S.C. 103

Claims 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hook (U.S. 4,046,601) in view of Applicants' alleged admission of prior art. For the reasons discussed below, reconsideration and withdraw of the rejection of these claims is respectfully requested.

The primary reference to Hook relied upon by the Examiner in the Office Action discloses a method for, according to the Examiner, producing a formed member of a steel sheet by (a) preparing a steel sheet material with a tensile strength of 317 MPa, (b) which contains Ti, Al, and and Cb (Nb) (i.e. nitriding elements), (c) forming a stamping or deep drawing (i.e, plastic forming, (d) subsequently strengthening the steel sheet by nitriding to achieve a final hardness of HRC 36 with (e) the full through thickness strengthened such that the hardness is essentially equal across the thickness.

The combination of Hook and Applicant admitted prior art do not disclose, teach or suggest each and every element of claims 19-26, as described above as required for a *prima facie* case of obviousness. Accordingly, it is respectfully submitted that the rejection of clams 19-26 should be reconsidered and withdrawn.

Moreover, the presently claimed offers many practical advantages which cannot be achieve by either the teachings of Hook or Applicant's admitted prior art, either taken alone or in combination. With respect to claims 19 and 23, for example, by making the tensile strength of the steel material 500 MPa or less, it is possible to sufficiently ensure the plastic formability such as press forming before nitriding treatment in producing a formed member for a vehicle. Furthermore, by making the average hardness in the sheet thickness direction of the steel sheet member after nitriding treatment Hv 300 or more, it is possible to obtain a formed member for vehicle body with a high tensile strength, so that significantly large economical effect can be obtained. That is, not only the sheet thickness can be made thinner, but also the necessity of reinforcing members can be eliminated, with

the result that not only reduction of body weight and reduction of material cost can be achieved, but also the necessity of mold costs and assembly processes are eliminated, which significantly increases the economical effect. Moreover, by setting the difference in hardness between the surface part and the inside center part in the sheet thickness direction of the steel sheet of the above formed member to Hv 200 or less, it is possible to avoid dramatic decreases of the tensile strength and elongation and achieve more stable strengthening of the vehicle body member. In addition to the above-mentioned advantages, by strengthening only a specific region of the formed member for vehicle body by the nitriding treatment, it is possible to harden and/or strengthen reliably specified regions (in other words, desired portions) in the formed member for vehicle body. Thereby, it is possible to control the mode of deformation when a collision load is applied to the vehicle body, and to absorb the collision energy with high efficiency.

With respect to claims 20 and 24, in addition to the aforementioned advantages discussed in respect to claims 19 and 23, Applicant submits that by performing a nitriding treatment on the second blank material of the formed member for vehicle body in accordance with the method and apparatus of the amended claims 20 and 24, it is possible to absorb the collision energy with high efficiency.

With respect to claims 21 and 25, Applicant submits that by setting a foam material by adhesion to at least the specified region made porous by the nitriding treatment, it is possible to increase remarkably the adhesive force of the foam material against the surface of the formed member for a vehicle body. Thereby, it is possible to obtain high efficiency in reinforcing the formed member for a vehicle body by filling the closed section space thereof with expanded foam material, as demonstrated by the test results shown on page 22 of the specification.

Finally, with respect to claims 22 and 26, Applicant submits it is possible to obtain the same advantages discussed above in respect to claims 19 and 23, since only a specific region of the formed member for a vehicle body (obtained by forming the preform having a pipe-like shape) is strengthened by the nitriding treatment.

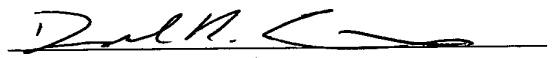
The aforementioned advantages offered by the presently claimed invention, therefore, make it possible to harden and/or strengthen reliably specified regions (in other words, desired portions) in the formed member for vehicle body. As such, the presently

claimed invention makes it possible to control the mode of deformation when a collision load is applied to the vehicle body, and to absorb the collision energy with a much higher efficiency than could heretofore be attained.

III. Conclusion

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, he is invited to call the undersigned to expedite the prosecution and work out any such issue by telephone.

Respectfully submitted,



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